

10/84

# LONG ISLAND GROUP Sinclair TIMEX

LIST (LONG ISLAND SINCLAIR TIMEX) GROUP  
P.O. Box 438  
CENTERPORT, N.Y. 11721-0438

## LISTING

### MEETING NOTES - SEPTEMBER 30, 1984

The September meeting was held at Marty J's house, and as usual, went overtime with a number of discussions on the day's topics. They were:

#### I. Old Business - see last months newsletter

- a) Treasurers report - Current Account balance is \$146.00. We project a surplus of perhaps as much as \$50.00@ years end (February 1).
- b) Membership continues to grow rapidly, we now have almost 1/2 again as many members as the list you received in September shows. We have members in N.Y., N.J., Utah, California, Ohio, Canada and Argentina.
- c) The tape "chain letter" idea seems to be working, our first set of tapes-to loop #3, came back with a number of public domain programs for the 2068 and 1000. In fact, the "Print and Plotter" Demo tape, provided by Bob H. (California) was perhaps the hit of the meeting. This tape is a sales demo for the Spectrum graphics package of the same name.
- d) Chuck R. provided copies of Library tape 1.0 to those who had not yet received theirs.

#### II. New Business

- a) Hot news announcement was that Emulators, and ROM's, work well on most software. We provided all interested parties with a look at Doug Dewey's software list. Doug and Triangle group have done an outstanding job of testing U.K. software. See this list before you buy, just in case the title you want is incompatible (about 3% don't work).
- b) The catalog file continues to grow. Many members received the joint distribution package from Zebra, Syntax, Ramex, Softsyn, etc.
- c) A suggestion to obtain club magazine subscriptions to U.K. magazines, particularly such exciting new efforts as 16/48 (an all tape format) was tabled until next meeting. The August issue of 16/48 was demoed part way.
- d) Articles are needed for the newsletter. Remember, we have members at all levels of sophistication. Please share your experiences with us.
- e) We have contacted the National Software Library in the U.K. They won't rent Spectrum software out of the country, as they feel it is too risky (can't really say I disagree). We (or you) can open up a franchise for the U.S. though. Initial investment is \$300 plus about \$3.00 each for the tapes (you'll need about 200-500 titles) Contact Paul D. if you're interested.
- f) Herma, a German label outfit, can produce Pressure Sensitive Thermal labels which work in your Timex printer. I have already tested samples of their label stock. Price, again is steep at about \$250. for the first 20,000 labels (on the correct size rolls). If you'd like to get some of these, let Paul D. know. If he gets enough requests, perhaps a buying group, like List Associates, can be formed. Main problem with these for mailing labels is that they are still sensitive to heat.

#### III. Special Session

We were blessed with not one, but two, guest speakers. Al Levy of LICA (Long Island Computer Ass'n) and Stewart Newfield of Zebra Systems. They were as delighted to meet each other again after several years, as we were to have them present.

Al gave us a rundown on what L.I.C.A. is and does. LICA is an "Umbrella" organization and has special interest groups on just about every major system (even Polymorphic). Dues are \$12/year and include a subscription to "The STACK", their newsletter. They mail 1000 copies of "The STACK" monthly. Meetings are the third Friday of each month at N.Y.I.

Our members were encouraged to visit some of their meetings and, of course, join up if they like what they see. LICA often has guest speakers on the latest hardware and software. We could become a Special Interest Group (SIG) within L.I.C.A., If at least 9 of our members join it, we would receive editorial space in the STACK for our newsletter and the use of their meeting facilities.

Lively discussion of Al's proposal continued on after the meeting and will be a part of next months business meeting.

Stewart gave us a rundown on where our computers came from and where he sees them going, and Zebra's and our positions in all this. To the best of his knowledge there were about 2 million IS 1000's made and 100,000 2068's. Most of these have gone to consumers. Rumors of the Higgenbottom deal and Sinclair deal with Samsung still persist. Biggest market right now is - Argentina.

Zebra has a staff of 4 and is 95% Timex oriented. They are working on new peripherals. Edge Connectors are due in 3 weeks (by the time you read this). A voice synthesizer, using the Votrax SCO chip, has been built and, we hope, will be demoed next meeting. They are also developing a KOALA Board graphics interface, which should sell for about \$40.00 (without the Board).

Stewart discussed the confusing situation with Anchor & Westridge on the MODEM. Zebra will be posting improvements to the documentation on their BBS, as they learn them. There is a chance that cartridge based software may come out.

He also says that at last count there were only about 70 emulators out there, to add to our dozen ROM's. No word yet on Bill Russell's sales.

Stewart, like Al Levy, gave us lots of encouragement and both helped to liven up the meeting. The only down note was his long range prediction. Yes, support will decrease in the long run. If we work at it though, we'll still be using these excellent machines for a very long time.

# LIST GROUP

## IV. Demos

Bob G. demoed his Tasword II, centronics IF and printer. The 64 column mode is the real attraction here. Bob has modified his printer to handle roll fed paper, for only a few dollars.

Print N Plotter, and 16/48 magazine were demoed. Print N Plotter demo contains one UDG/action sequence (in BASIC and MC) and 4 stunning hi-res graphic portraits which are stored in Hi-mem and flashed on the screen every few seconds. 16/48 has games, reviews and utilities - all already keyed in.

Chuck R. bought one of the Spartan Monitors (\$29.95) and is as happy with his as Jeff is.

## V. Vistors

We also had some non-(and let's hope new)-member visitors. Peter R. and a friend were looking for info on 64 column mode and Herbert W. gave us some insight into the communication systems available (BBS's, MCI mail, etc.).

## VI. Next Meeting

Will be at Harvey R's house, 5 Peri Lane, Valley Stream (members see map on "members only" page) at 2PM, on Sunday October 28th. Bring your latest toy.

## VII. Feedback

Feedback on the number and type of articles in the newsletter has been 100% favorable. That is, one person told me he liked it. Write and tell us what you'd like to see here; more TS1000 stuff, utilities, reviews, what?

## LISTING

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## DID YOU KNOW?

In addition to the TRS-80 (not the Color Computer), there are several other machines which use the same microprocessor (the 280) as our TS machines:

Interact (uses 8080)  
Aquarius (Mattel)  
Adam (by Coleco)  
CP/M machines

This means that, with proper buffering, decoding, and connectors, in many cases you might be able to use hardware designed for the system on yours and vice versa. Kurt H., for example, has hooked up an Aquarius MODEM (selling for under \$20.00) to his 2068, just by rerouting the data, IOREQ and some of the Address lines.

## PLEASE NOTE OUR NEW ADDRESS

LIST GROUP  
P.O. Box 438  
Centerport, N.Y. 11721-0438

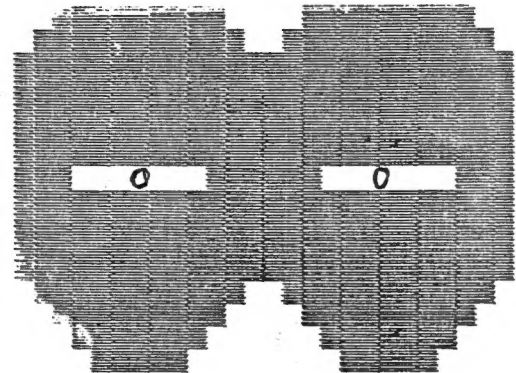
# TRICK OR TREAT

HAPPY HALLOWEEN!

```

10 REM THE BLACK MASK
20 RANDOMIZE
30 DIM P$(2,7)
40 REM INITIALIZE VARIABLES
50 FOR X=1 TO 7
60 LET P$(1,X)=CHR$ 32
60 LET P$(2,X)=CHR$ 128
70 NEXT X
80 LET P1=9
90 LET P2=22
100 LET U=1
110 LET Q=0
120 LET FL=0
130 FOR X=9 TO 22 STEP 13
140 LET P=4
150 FOR Y=2 TO 17
160 FOR Z=X-P TO X+P
170 PRINT AT Y,Z;CHR$ 143
180 NEXT Z
190 IF Y<4 THEN LET P=P+1
200 IF Y>12 THEN LET P=P-1
210 NEXT Y
220 NEXT X
230 REM DRAW WHITES OF EYES
240 LET KO=1
250 GO SUB 1000
260 REM PRINT PUPILS
270 PRINT INK 2;AT 9,P1;CHR$ 79
;AT 9,P2;CHR$ 79
270 IF P1=10 OR (P1=12 AND P2=2
5) THEN LET Q=5
280 FOR D=1 TO RND*20+0
290 NEXT D
300 LET Q=0
310 REM ERASE PUPILS
310 PRINT AT 9,P1;CHR$ 32;AT 9,
P2;CHR$ 32
310 REM BLINK SOMETIMES
320 IF P1<>9 OR RND<0.7 THEN GO
TO 380
330 LET KO=2
340 GO SUB 1000
350 FOR D=1 TO 5
360 NEXT D
370 GO TO 240
370 REM COMPUTE NEW POSITIONS (
P1,P2)FOR PUPILS
380 IF P1=8 OR P1=12 THEN LET U
=-U
390 IF FL=0 OR P1<>9 THEN GO TO
480
400 LET FL=1
410 GO TO 430
420 IF P1<>9 OR RND>0.2 THEN GO
TO 450
430 LET FL=1
440 LET U=1
450 LET P1=P1+U
460 IF FL=0 THEN LET P2=P2+U
470 IF FL=1 THEN LET P2=P2-U
480 GO TO 280
990 REM FILL EYES WITHP$(KO)
1000 PRINT AT 9,6;P$(KO);AT 9,19
;P$(KO)
1001 PRINT INK 2;AT 20,1;"THE PH
ANTOM IS WATCHING YOU"
1010 GOTO

```



THE PHANTOM IS WATCHING YOU !

INSANE COMPUTER

from Patrick Spira  
SYSOP-CIS-SEC. 1

This is a further expansion on  
the sound program for insane  
sounding computers.

```

10 LET A=INT (RND*255)
110 LET B1=INT (RND*15)
110 LET B2=INT (RND*255)
110 LET B3=INT (RND*15)
110 LET B4=INT (RND*255)
110 LET B5=INT (RND*15)
110 LET B6=INT (RND*255)
110 LET B7=INT (RND*15)
110 LET B8=INT (RND*255)
100 SOUND 0,A,1,A1,B2,B3
A3 4 A4 5 A5 6 A6 7 A6 8 15
9 15 10 15
;B3=0
;B5=0
;B7=0
IF INKEY$="P" THEN GO TO
GO TO 10
PRINT "CHANNEL 1: FINE="
;A
PRINT "CHANNEL 1: COARSE="
;B1
PRINT "CHANNEL 2: FINE="
;A2
PRINT "CHANNEL 2: COARSE="
;B2
PRINT "CHANNEL 3: FINE="
;A3
PRINT "CHANNEL 3: COARSE="
;B3
PRINT "NOISE=" ;A5
PRINT "ENABLE=" ;B6
PRINT "NOTES=" ;B7
;B8
COPY
CLS
GO TO 200
;B3 AND SOUND LINE 1

```

What this program does is send  
only 8 of the sound channels.  
By pressing any key you can  
reset the randoms. As a result  
you can listen to the sounds,  
pressing the ones you don't  
like. If you do hear something  
you like just press "P" and it  
will print the current channel  
data to the screen. Press any  
key again and it will present  
you with a hardcopy.

The practical use is obvious.  
Now you don't have to be a wiz  
to come up with laser and  
speakers sounds. The program  
will do it for you.

ENJOY

Adapted from FAMILY Computing - By Harvey Rait

ALT-5-T GROUP

```

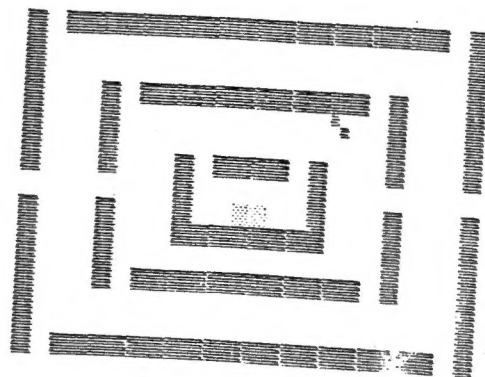
5 REM ROBOT
10 SLOW
20 PRINT AT 4,2;"HERE ARE YOUR
CONTROL KEYS:"
30 PRINT AT 6,13;"U I O"
40 PRINT AT 7,13;"J L"
50 PRINT AT 8,13;"N M."
60 PRINT AT 1,2;"PRESS<ENTER>T
0 CONTINUE."
70 LET K#=INKEY#
80 IF K#<>CHR# 118 THEN GOTO 7
0
90 CLS
100 FAST
110 LET SC=PEEK 16396+256*PEEK
16397+1
120 LET S=1000
130 LET HR=13
140 LET HC=15
150 LET F=0
160 LET H3=0
170 LET P1=1
180 LET P2=1
190 LET J=0
200 LET D$="6,25,3,10,21,6,12,1
0,8,14,17,11,10,21,14,5,25,17,3,
0,4,11,17,4,6,9,8,11,14,8,8,11,1
0,8,11,10,6,9,20,11,14,20,3,9,27
,11,17,27,"
210 PRINT AT 6,15;CHR# 135
220 PRINT AT 9,16;CHR# 135
230 FOR X=1 TO 15
240 GOSUB 1000
250 LET A=VAL N$
260 GOSUB 1000
270 LET B=VAL N$
280 GOSUB 1000
290 LET C=VAL N$
300 FOR Y=A TO B
310 IF X<=6 THEN PRINT AT C,Y;C
H# 128
320 IF X>6 THEN PRINT AT Y,C;CH
R# 128
330 NEXT Y
340 NEXT X
350 LET H1=INT (RND*20)
360 LET H2=INT (RND*3)+28*(RND)
0,5)
370 SLOW
380 PRINT AT 21,14;S;"
390 LET S=S-1
400 LET J#=INKEY#
410 IF J#<>" " THEN LET J=CODE J
#
420 LET RO=H1+(J=27 OR J=50 OR
J=51)-(J=46 OR J=52 OR J=58)
430 LET CO=H2+(J=27 OR J=49 OR
J=50)-(J=47 OR J=51 OR J=58)
440 LET RO=RO-(RO>20)+(RO<0)
450 LET CO=CO-(CO>31)+(CO<0)
460 LET PEEK (SC+RO*33+CO)<>128
THEN GOTO 380
470 LET RO=H1
480 LET CO=H2
490 GOTO 380
500 PRINT AT 21,H2;CHR# 0
510 PRINT AT RO,CO;CHR# 23
520 LET H1=RO
530 LET H2=CO
540 IF RO=0 AND (CO=15 OR CO=16
) THEN GOTO 740
550 LET RH=H3+(RO>HR)-(RO<HR)
560 LET CH=HC+(CO>HC)-(CO<HC)
570 LET RH=RH-(RH>20)+(RH<0)
580 LET CH=CH-(CH>31)+(CH<0)
590 LET CA=PEEK (SC+CA*33+RA)
600 IF CH<>128 AND CH<>136 THEN
GOTO 680

```

```

610 LET RA=HR
620 LET CA=HC
630 LET D=2*INT (RND*2)-1
640 IF F THEN LET RA=HR+D
650 IF NOT F THEN LET CA=HC+D
660 LET F=NOT F
670 GOTO 580
680 PRINT AT RA,HC;CHR# 0
690 PRINT AT RA,CA;CHR# 134
700 LET HR=RA
710 LET HC=CA
720 IF CO=CA AND RO=RA THEN GOT
880
730 GOTO 380
740 CLS
750 IF S>H3 THEN LET H3=S
760 FOR T=1 TO 50
770 PRINT "YOU DID IT."
780 NEXT T
790 CLS
800 PRINT "YOUR SCORE IS";S;"."
810 GOTO 840
820 CLS
830 PRINT "SORRY YOU WERE CAUGH
T."
840 PRINT "THE HIGH SCORE IS";H
6;"
850 PRINT "PRESS<ENTER>TO PLAY
AGAIN."
860 LET K#=INKEY#
870 IF K#<>CHR# 118 THEN GOTO 8
60
880 GOTO 80
1000 IF D$(P1)=" " THEN GOTO 103
0
1010 LET P1=P1+1
1020 GOTO 1000
1030 LET N$=D$(P2 TO P1-1)
1040 LET P1=P1+1
1050 LET P2=P1
1060 RET

```



#### WE HAVE SPECTRUM ROM'S

AVAILABLE TO LIST MEMBERS \$18.00,  
NON-MEMBERS \$19.95. PRICE INCLUDES  
POSTAGE AND PACKING. MAIL CHECK,  
NO TO

LIST ASSOCIATES  
10 Idle Day Drive  
CENTERPORT, N.Y. 11721

Title: SPECTEXT  
 Function: Word Processor  
 From: McGraw Hill  
 Shoppenhangers Road  
 Maidenhead Berkshire  
 England  
 For: 48k Spectrum  
 Price: £15.00

GOT TASWORD TWO?

WORD PROCESSING

GOT OLIVETTIS PR 2300?

Richard Cunningham offers the following tips:

This is "learn while you learn" time, for me, as I try to learn the Spectext Word Processing commands while writing this product review. Please bear with me as I discover what the programs can do.

Spectext is actually four programs on one cassette, the first, "SPECTEXT" is a fairly complete WP package and allows cursor editing of text, printer formatting (line feeds, page & page feeds), and global seek and replace (called Alter by Spectext). Only thirty-two character screen printing is supported, but unless you have a monitor, you would find a 64 column display very hard to read. You won't see the text on the screen in the same way it will print out, until you call for a print option. That is, you just type in your text, ignoring the screen format during entry. For example, as I look up at the screen now I see that the word "entry" in the last sentence is split up with "entr" on one line, and "y" on the next. This will not be the result when you read it.

This feature is called "word wrap" and it takes care of this basic housekeeping chore very nicely. You will note however, the ragged right edge of this text. This is caused by the same feature, and you may find that going back and rephrasing a few words will make the final printout more attractive.

Spectext allows formatting for printers other than the HP. It has Kempston Centronics and others built in up to 128 characters per line, and can be adapted to other Spectrum interfaces, particularly those which use LPRINT.

The instructions for Spectext come as two text files on the back of the cassette, and you must print them out if you want them handy. This method of providing the documentation is not to my liking as the two files require about 8 feet of printer paper. Having the files in text can be up to 12k, by the way, to experiment with is one thing, but this is a rather expensive and difficult way to learn to use the package. One must cut and paste to obtain a useable document.

Spectext is, as I mentioned, one of a suite of four programs. The others which come in the package are: "Specfiles" a sort of data base, "Specmerge", which allows you to merge data base fields like a name, or address into a text file, and "Printmod", which should help you reconfigure for a different type of printer. "Specmerge" could be used, for example, to generate one of those annoying personalized "Dear Mr. [name], which is the middle of the text, and the letters addressed to the [name] family."

I'll be reviewing these programs in an upcoming issue of this publication. The Spectext WP package is a real bargain at £15.00. It's a real bargain, even if you don't have a monitor. There is a lot of on-screen editing, and the keyboard is very easy to use. The package takes a lot of time to learn, but it's worth it. The package is a real bargain at £15.00. It's a real bargain, even if you don't have a monitor. There is a lot of on-screen editing, and the keyboard is very easy to use. The package takes a lot of time to learn, but it's worth it.

INK-PAPER-COLOR-BORDER--CODES-INSTRUCTIONS Feb 7/Asword 2

To change the paper and ink colors poke the addresses indicated below.

NOTE: When inserting margin indicators the indicators may not change color when certain color combinations are set.

Paper and ink color adjustments are effective on 64 CPL only. 32 CPL screen remains unaffected.

POKE INSTRUCTIONS

Poke the following locations. You must poke all 4 locations. You must poke the same value for X at both indicated locations.

VALUE OF X = PAPER COLOR VALUE \* 8 PLUS INK COLOR VALUE

POKE 58512,54  
 POKE 58513,X  
 POKE 58521,54  
 POKE 58522,X

VALUES TO POKE

INK Value/color	PAPER (8*Col.value)	INK Value/Color	PAPER (8*Col.Value)
1 BLUE	8	5 CYAN	40
2 RED	16	6 YELLOW	48
3 MAGENTA	24	7 WHITE	56
4 GREEN	32	0 BLACK	0

COMBINATIONS AND VALUE ENTRIES

INK:	BLACK	BLUE	RED	MAG.	GREEN	CYAN	YELLOW	WHITE
PAPER								
0 BLACK	XXX	1	2	3	4	5	6	7
1 BLUE	8	XXX	10	11	12	13	14	15
2 RED	16	17	XXX	19	20	21	22	23
3 MAGENTA	24	25	26	XXX	28	29	30	31
4 GREEN	32	33	34	35	XXX	37	38	39
5 CYAN	40	41	42	43	44	XXX	46	47
6 YELLOW	48	49	50	51	52	53	XXX	55
7 WHITE	56	57	58	59	60	61	62	XXX
PAPER								

TO CHANGE BORDER COLOR

To change the BORDER COLOR enter basic and Execute:

TO CHANGE THE 64 CPL BORDER: POKE 64516,X

To change the 32 CPL border: POKE 60641,X

X = border color 0-7 as above.

GRAPHICS CONTROL CODESTASMAN TWO WORD PROCESSOR---OLIVETTI PR 2300 PRINTER

KEY	GRAPH/CODE	CONTROL CODE	FUNCTION
1 CAP/SH	129 142	32 27 39 32 27 37	DOUBLE HEIGHT PRINT-ON DOUBLE HEIGHT PRINT-OFF
2 CAP/SH	130 141	32 27 14 32 27 15	DOUBLE WIDTH PRINT-ON DOUBLE WIDTH PRINT-OFF
3 CAP/SH	131 140	32 27 60 32 27 61	10 CHAR. PER INCH. 12 CHAR. PER INCH.
4 CAP/SH	132 139	32 27 62 32 27 48	18 CHAR. PER INCH. CANCEL- ALL CODES. RE-SET TO
5 CAP/SH	133 138	32 27 69 32 27 70	(DEFAULT-NORM., 10, 1/6") 1/6" VERTICAL SPACING 1/8" VERTICAL SPACING

(NOTE: No double underline in same line with dash or normal )  
 ( Underline: dash and normal underline in same line O.K. )

6 CAP/SH	134 137	27 42 48 27 42 49	UNDERLINE-ON: NORMAL UNDERLINE-ON: DOUBLE
7 CAP/SH	135 136	27 42 50 27 43	UNDERLINE-ON: WITH DASHES UNDERLINE-OFF
8 CAP/SH	128 143	32 12 32 7	FF-FORM FEED TO NEXT PAGE BEL-INSERT BUZZER SOUND

CODES MAY BE ENTERED TO ANY KEYS DESIRED.

These codes should be entered into TASMAN TWO after obtaining the STOP (define graphics-g) mode, in accordance with the instructions for the word processor.

P5



Mr. Paul J. Donnelly  
Chairman  
LIST  
10 Idle Day Drive  
Center Port, New York 11721

September 18, 1984

Dear Mr. Donnelly:

Thank you for your letter requesting various T/S 2068 information.

Regarding parts availability for the T/S 2068, I am afraid we cannot help you out. We do maintain a limited stock of replacement parts in our Little Rock Service facility, but that stock is so limited that we cannot sell the parts on hand. We need to keep what is available for repair purposes. As you know, the SCLD (U3) is a custom chip, and there is no commercial equivalent for it. If someone's T/S 2068 computer has a defective SCLD, or any other defect, they can send the computer to Little Rock for service. If the product is in warranty, there is no charge except for your shipping charges to Little Rock. If the product is out of warranty, we have established a maximum repair charge for T/S 2068's of \$30.00. Regarding parts for the T/S 1000, we have until recently been selling individual piece parts for the T/S 1000. However, our stock of such parts has now been depleted to the point that we are in danger of running out of adequate supplies to cover our servicing requirements. Consequently, we are no longer selling individual piece parts for the T/S 1000. The entire computer is available at such low prices in many locations, that an extra computer would probably be the least expensive source of spare parts.

Regarding T/S 2068 peripherals, I can give you some help here. The modem is available from Westridge Communications, 330 Washington Street, Marina Del Rey, California 90292. The phone number there is (213) 306-5110. We have no recommended sources of supply for other peripherals, however, I suggest you contact Doug Dewey at the Triangle Sinclair Users Group, as his newsletter publishes advertisements for firms that produce peripherals. Doug Dewey's address is 206 James Street, Carrboro, North Carolina 27510. His phone is (919) 929-3079. I do know that interfaces for printers, disc drives, and other devices are available from Ramex in Utica, Michigan (phone 313 463-1795) and Aerco in Austin, Texas (phone 512 451-5874).

Doug Dewey could give you the names of some other firms as well.

Regarding the E-prom cartridge board described in the T/S 2068 Technical Manual, we have no objection to anyone producing such boards. That is why we provided the schematic and printed circuit board art work in the manual. We have not given or withheld permission for anyone to manufacture spectrum emulator boards utilizing the E-prom cartridge board. We are aware that some boards are available for sale, and I suggest you contact Doug Dewey regarding such boards before you go to the expense to produce them yourself.

We have no objection to your publishing the extract of the technical manual (Paragraphs 6.6.1 through 6.6.5) in your newsletter. By the way, the technical manual continues to be available from the Timex Materials Sales Division whose address is P.O. Box 1378, Little Rock, Arkansas 72203. The price is \$25.00 including a reduced size schematic. We have reprinted the manuals, and they are now being sold with a glued binding. In addition, the schematics have been reprinted and are now easier to read. You might wish to notify your membership that the manual is available.

We appreciate your favorable comments about the T/S 2068, and your continued support. Thank you very much.

Regards,

*D. Smith*

Doug Smith  
Manager - Product Planning

\* I tried this and was given these #'s:

\* (203) 306-4103  
(818) 997-7758 (Best)  
(818) 784-6088

## 6.6 GENERAL

6.6.1 Pressing ENTER multiple times with an invalid tape command on the edit line (syntax error) causes the system to reset. This is due to overflowing the Bank Status Stack in RAM Chunk 3/7 due to the multiple calls to and from the Extension ROM via the Call Bank code without normal termination (the error causes a RESTART 8 to be executed out of Home ROM code called from the ROM Extension). It shouldn't take anybody that many tries to get a tape command right, so this is not a real problem, but you may want to keep it in mind. For any call made through the OS RAM services, you should have a corresponding return to keep the structures clean.

6.6.2 ON ERR GOTO - If a non-existent line number is specified, followed by an error, the system will hang. The ROM code is in an endless loop trying to report the absence of a valid error handler to the non-existent error handler!!! On some errors, you will get an unexpected 0 OK termination showing the line number of your Error Handler. This is because some ROM routines temporarily clear the INTPT Flag (Bit 7 of FLAGS). This flag is set to 0 when checking syntax and set to 1 when executing; if an error is detected while the Flag=0, the error handler code is branched to but is not executed.

6.6.3 Parameters to the SOUND command are not fully validated, therefore you can specify a number beyond the valid range for a given operation and not get an error, for example, you can write a value greater than 63 to the Enable Register (Reg.7), possibly changing the I/O Port used for reading the joysticks from input to output. If you specify a number larger than 255 (FFH), only the least significant byte will be actually written to the Programmable Sound Generator. Access to PSG Reg. 14 (IO-A) used for the Joysticks is also not precluded via the SOUND command.

If you experience difficulty in reading the joystick(s), do a write to PSG Reg. 7 clearing Bit 6 to 0 to guarantee that the joystick path is enabled for input (see Section 4.3). This write can be done by executing a SOUND 7,63 (or any value less than 63).

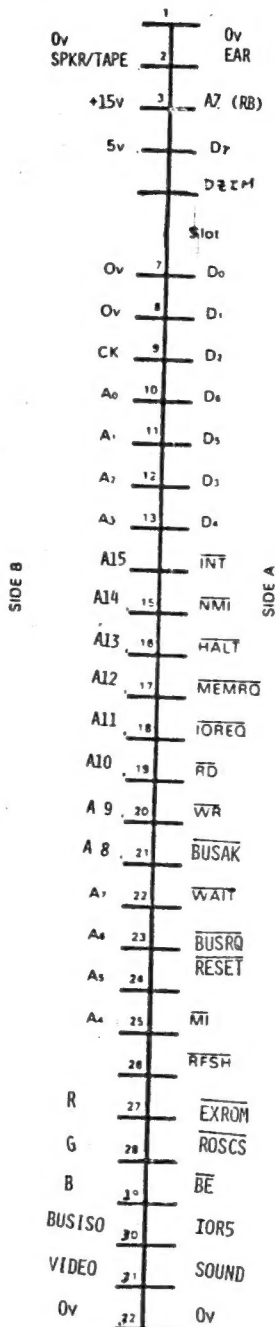
6.6.3 The INTEGER function for (-65536) gives an incorrect result of -1, and for other cases where the result should be -65536, it gives -1E-38. Since the ROM code cannot be changed, there is no correction.

6.6.4 If you respond to the SCROLL? message using multiple keys such as Cap Shift/2 or Cap Shift/Symbol Shift, you will get strange results like dumping of the Edit Line with the "C" or "E" cursor, display of ROM data, or multiple scrolls. Stick to single key responses and you won't have any problems!

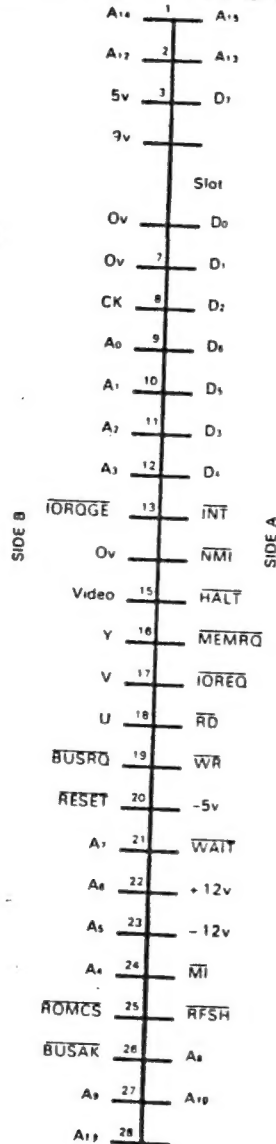
6.6.5 When DELETE (Cap Shift/0) is held down to do deletion of characters in the Edit Line, sometimes it outputs the DELETE Keyword instead (it should not do this in auto-repeat mode). This is especially noticeable when the input line is long. Since the ROM code cannot be corrected, you must try releasing and pressing the DELETE key at differing frequencies and you will be able to get past this "bug".

# TS2068

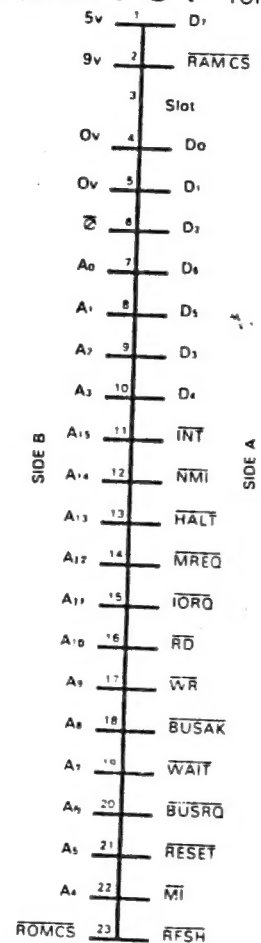
## Edge Connector signal allocation



### SPECTRUM



### ZX-81



### HARDWARE HACKERS

Here's a little chart I made up to help me keep the edge connectors straight. Originally adapted from Sinclair Projects.

I suggest you use a "highlighter" (like STABILO BOSS) to mark the connectors which are the same on all three, or just two. You'll need more than one color.

# INTERNAL RGB/RESET BUTTON MODIFICATION FOR THE T/S 2068

**WARNING:** Modification requires opening the computer case, drilling one hole and cutting out a slot for a connector which will void any warranty from the manufacturer.

## PARTS REQUIRED:

- 1- 9 pin "D" connector, female (same as JOY STICK connector).
- 1- small N/O push button switch for RESET.
- 2- 4-40 x 1/2 inch bolts and nuts to secure connector.
- 2 feet of plastic insulated hook-up wire.

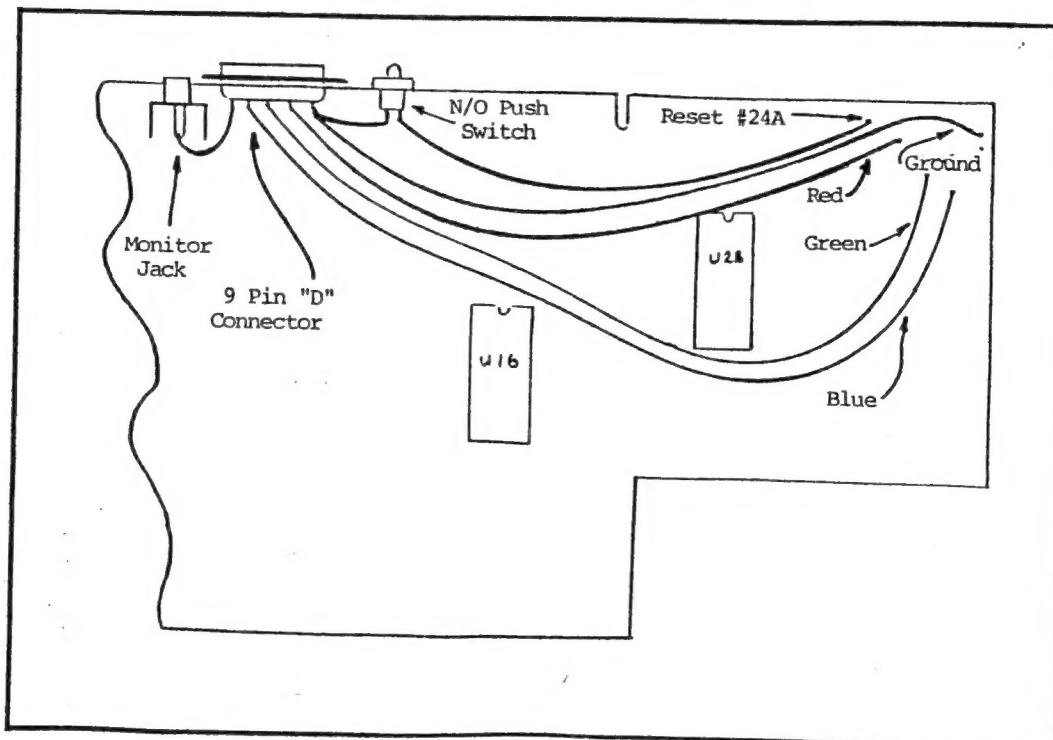
## TOOLS REQUIRED:

- Sharp knife (X-ACTO type).
- Soldering iron and solder.
- Small file.
- Drill bits and drill (holes for bolts and N/O push switch).
- Phillips screw driver.

## MODIFICATION - MECHANICAL

Place the T/S 2068 on a flat surface which is covered with a towel or foam, on the keyboard side. Remove each of the seven (7) Phillips head screws. Turn the case over on the back and carefully pry the case apart. Hold the keyboard section at a right angle to the bottom section and remove three (3) Phillips screws securing the PC assembly to the case bottom. With a pencil, mark the section on the inside, back of the case, the span between the "MONITOR" jack and the small PC sub assembly (#335-80006). This is approximately two (2) inches. Set aside the keyboard section with PC assembly. Using the template provided, slowly and carefully cut into the case around the outline for the "D" connector. This will require repeated cutting. Fit the Female "D" connector into the opening from the outside of the case. If opening is too tight use a file to enlarge it. Drill both holes for the bolts and secure the connector to the case with the 4-40 bolts and nuts. Drill a hole for the N/O push switch. Insert the switch into the hole previously drilled and secure with the hardware provided on the switch.

DIAGRAM 1: COMPONENT LAYOUT





# MODIFICATION - ELECTRICAL

Place the PC assembly into the bottom case. Do not secure with screws at this time. Prop up the keyboard section with a pencil.

Cut a short length of wire to connect to the lug of the push switch with the pin on the "D" connector which is closest to the switch. Solder the wire to the push switch ONLY.

Locate the GROUND (2 plated through holes) on the computer edge connector. This is at the far right-hand side of the edge connector.

Cut a length of wire to connect the GROUND at the edge connector with the same "D" connector terminal that the short wire will connect to from the push switch.

Solder both wires to the connector terminal and to a ground plated through hole.

From the GROUND terminal on the 2068 edge connector, locate the 9th terminal (#24A). This is RESET.

Cut a length of wire from the plated through hole which connects to the RESET terminal to the free lug on the push switch. Solder the wire in place.

Locate the three (3) plated through holes, which are located just below the edge connector at the far right of the PC assembly. These contacts are "RGB" respectively.

The upper hole is Red; the center hole is Green; and the lower hole is Blue.

Measure and cut three (3) lengths of wire to connect the RGB plated through holes to three terminals on the edge connector, then solder these wires in place.

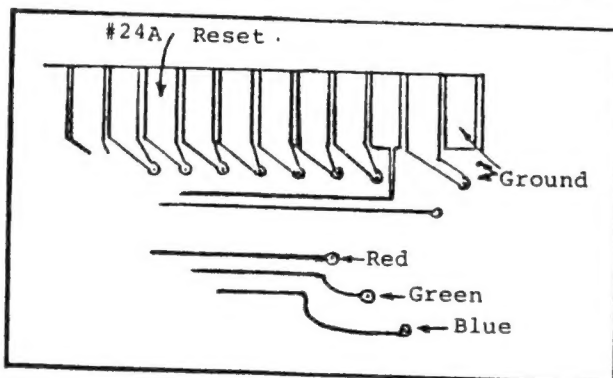
Measure a short length of wire from the connector to the center contact on the computer MONITOR jack (This connection provides a SYNC signal to the RGB monitor).

Solder the wire in place.

Carefully inspect all of your solder connections to insure that they do not have shorts and/or solder bridges. When satisfied that everything is OK, replace the three (3) screws securing the PC assembly to the case bottom.

Carefully re-assemble the computer case with the seven (7) Phillips head screws previously set aside.

DIAGRAM 2: TOP, RIGHT-HAND SECTION OF 2068 EDGE CONNECTOR



## CHECKOUT:

A mating connector from the 9 pin "D" connector is required for RGB checkout. The cable detailed from last month's article (EXTERNAL RGB MODIFICATION) can be used if the cable ends are removed from that assembly and soldered to a MALE "D" connector.

Power up the monitor and the computer. If all is well, the copyright message should appear on the screen. If a problem exists, re-check all connections previously made. Press the RESET button. The screen will clear, then display the black box and then the copyright message.

Key in the following short program, "COLOR BARS".

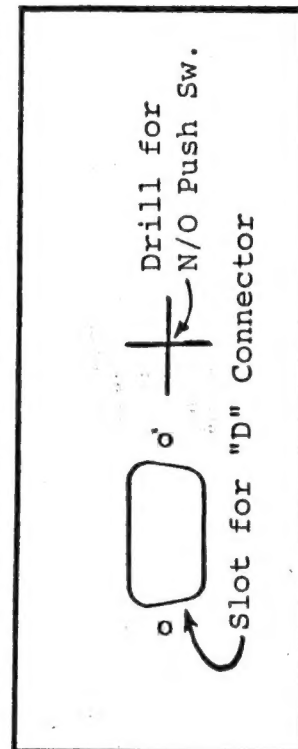
10 FOR b=1 TO 22: For p=7 TO 0 STEP-1

20 paper p: PRINT " ";:REM 4 spaces between quotes

30 NEXT p: NEXT b

Behold the beautiful sharp image on the monitor screen that can only be possible with RGB.

FULL SIZE CUTTING AND DRILLING TEMPLATE-RGB MODIFICATION



PLEASE NOTE OUR NEW ADDRESS

LIST GROUP

P.O. Box 438

Centerport, N.Y. 11721-0438

ITEM: Winky 2000  
 FUNCTION: Filter, Attenuator for Cassette Recorders  
 FROM: G. Russell - Electronics  
 RD 1 Box 539  
 Centre Hall, Pa 16828

PRICE: \$20.00

Winky 2000 is Bill Russell's latest cassette computer interface. It is designed to help you get good LOADs and make backup copies of your 2068 and Spectrum tapes.

The board is a small (1 1/2 X 2") open-faced design on which are mounted some 13 passive components (Resistors, diodes and capacitors), three mini (1/8") jacks and an 1/8" mini plug on a 3" cord. It is used by plugging the cord into your "master" tape recorder and then plugging your computer-cassette cable into either the Duplicate (to make copies) or LOAD (to load your computer) sockets. The third jack is for a mini ear-phone, so you can listen-in to what's going on. The board gets it's name from two LED's, one (or both) of which will glow as the volume of the signal you feed it reaches the correct level.

In the LOAD mode, little "massaging" of the signal is performed. The main value of using the Winky 2000 for loading from cassette to computer comes from your ability to monitor the signal through the ear jack and the blinking LED. After trying out only a few tapes, you should be able to add the audio and visual information you receive from these tell-tales to what you see on the screen and set your tape recorder volume at the right level, every time. This can be a real time saver, especially if your tapes come from a number of different sources.

For duplication, the board uses diodes to clip the signal it receives and a  $\pi$  network to reduce the 5Vpp-into-8- $\Omega$  signal it receives from your "master" recorder to a 5-mV-into-600- $\Omega$  output signal to the MIC input of a second or "slave" recorder.

The duplication feature is outstanding and has worked with almost every tape I've tried. Those few that failed the test were usually on cheap tape and had insufficient output to even begin to light the LED. (I've considered replacing the 240  $\Omega$  output resistor with a 1K pot to try to get a little more juice, but haven't tried it yet). I have even, successfully, made third generation copies (a copy of a copy of a copy) which will LOAD through Winky Board. This is a handy feature, as I had inadvertently destroyed an original Spectrum tape and was forced to make second and third generation copies for backup.

One other important feature of the Winky 2000 is its use as a tape head alignment device. By observing the intensity of the LED and listening for the highest sound level, while playing back a program tape, you can adjust the azimuth of your cassette recorder to the optimum recording position for each and every tape. Russell states that they adjust azimuth on every tape. I don't think that is, or should be, necessary, but it will get you more "first time" LOADs. Do remember that if you readjust azimuth for someone else's tape, you'll have to set it back up for your own, later. I agree with Bill Russell that head alignment problems probably cause more loading difficulties than any other.

Winky 2000 does not attenuate as much as the Winky Board II and may not be as good for the TS 1000 for that reason. The original WB does not do a good job on 2068 tapes. Remember too, that the 2068's system is much more reliable than the 1000's. In fact, I have a few tapes which will load (just barely) without the WB 2000, but lose just enough signal in the board that they won't load with it. Again, this is the exception, not the rule.

If you need to make backups of software protected Spectrum tapes, for example, I highly recommend the Winky 2000. I'm not really sold on the efficacy of the LOAD mode except as an aid to setting volume level. Do use the tape head alignment feature. I recommend you write a short program which DIM's and large string array and then set about 1000 elements to 0 and 1000 to 255. This will give you a nice test tape.

I found the Winky 2000 a bit high priced, considering its components (about \$5 retail), but still give it a 9 out of 10. As I've said before "No TS owner should be without one". If Winky 2000 allows you to save just one "lost" tape, it can pay for itself immediately.

#### CATALOGS RECEIVED

2068

This is a sampling, many more catalogs are in the library:

#### VENDOR

#### PRODUCTS

Tasword - \$49.95  
 PRO/FILE - Some UK  
 Software

#### SUNSET ELECTRONICS

Tasword, Heath, also has Arcan Interface,  
 Byteback

#### SOFTSYNC

Zero Assembler  
 Micro-As (Magic)  
 Voice Chase

#### ZEMBA SYSTEMS

Host Software & Hardware

#### HEATH COMPUTER

Home & Business Applications

#### TS 1000

Most houses listed above also carry TS 1000 materials, Summit, in particular, has low prices on Windows software.

#### KALTECH

Sells a very basic sensor system  
 to measure humidity with events  
 using the cassette port. Less  
 than \$20.00

#### DAVE HERBERTS COMPUTER CLASSIFIES

Buy, Sell, or Trade, users classified ads.

#### SPECTRUM

#### DISCOURT SOFTWARE

Host Specy Titles

#### MELBOURNE HOUSE

The Hobbit, Abernethy Forth, books

#### NATIONAL SOFTWARE LIBRARY

300 Titles, also ZX 81

#### PV TUNES

Host Titles (List price)

#### MORE LITERATURE

#### AERON DISK NATIONSIDE

Users Group  
 Box 49  
 Marham, N.J. 07747

There are about 350 of us  
 For more info contact Paul G.

#### RESEARCH SERVICE LABS

Box 19124  
 Oklahoma City, OK 73144

Assemblers Dis, Forum prog. (\$75)  
 Printer interface (\$50)  
 For 2068 & ZX81

#### ROMPACK

1325 Aviation Blvd - #1111  
 Redondo Beach, Ca 90278

Quickload, Pro/FILE & others  
 on cartridge for TS1000

#### E. ARTHUR BROWN

3402 Pannet  
 Alexandria, MS 38308

Host 2068, Hardware & Software

#### CURRY COMPUTER

3344 West Hanif Lane  
 Glendale, Ar. 85306

Trivia Game & Host Hardware/Software  
 for TS 1000/2068

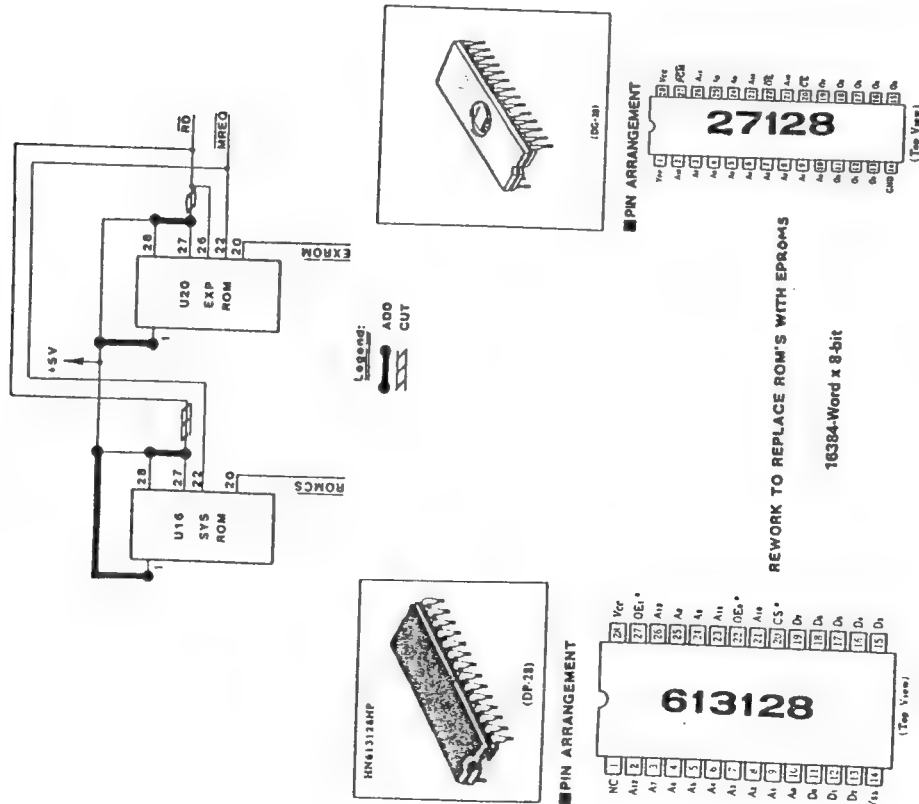
#### SOFTWARE SUPERMARKET

87 Howard Lane

Spectrum Software

P10

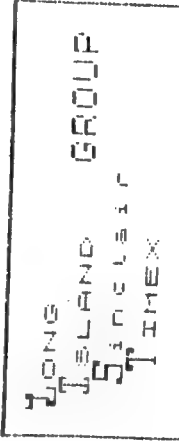
# HOW ROM'S & EPROM'S COMPARE:



Read Only Memory

Erasable and Programmable Read Only Memory

2068



## 1-POKE TO SHIFT BETWEEN CAPS AND LOWER CASE WITHIN PROGRAM

To place program in CAPS mode from within a line:  
POKE 23658,8 CAPS  
To place program in Lower Case from within a line:  
POKE 23658,0 Lower Case

## 2-POKE TO MAKE KEY BEEP

To make keys beep when pressed:  
POKE 23609,0 OFF  
POKE 23609,X ON

X Equals duration of beep.

NOTE: range 10-100 will provide satisfactory results. Using beep will slow down typing speed.

## 3-POKE TO ACTIVATE CONTINUOUS SCROLL

POKE 23692,1 NORMAL SCROLLS FULL SCREEN WITH 'SCROLL?'  
POKE 23692,255 CONTINUOUS SCROLL.

4- POKE TO INCREASE SPEED OF KEY FUNCTION  
Time in 60ths. of a sec. that a key must be held down before it begins repeat sequence.

POKE 23561,35 NORMAL  
POKE 23561,X ADJUST SPEED

NOTE: The lower the number the faster the key reacts.

5- POKE TO INCREASE SPEED OF REPEAT FUNCTION  
Delay-in 60ths of a sec.- between successive repeats of a key held down.

POKE 23652,5 (normal)  
POKE 23652,X

NOTE: The lower the number the faster the key repeats.

## 6-POKE FOR UDG (USER DEFINED GRAPHICS)--SAVE AND LOAD

SAVE: "title" CODE 65268,168  
LOAD: "title" CODE 65268,168

NOTE: UDG Graphics, once entered reside above RAMTOP and will not be removed by NEW entries nor by loading a Basic program. When UDG Graphics are included in a Basic program the Basic must first be saved, usual way, and then Save UDG Graphics with Code as above.

To change first line of program to "0", POKE 26710,0;POKE 26710+1,0

Screen full of vertical lines: POKE23659,1

To eliminate SCROLL, add this POKE before a print statement:  
POKE 23692,255

Cursor in EXTENDED mode (E), POKE 23617,1;INPUT AS

Cursor in GRAPHICS (G), POKE 23617,2;INPUT AS

To restore cursor to INPUT (L), POKE 23617,0

For RAMTOP address: PRINT PEEK 23730+256\*PEEK 23731

## HOT FLASHES & COOL NOTES

1. **STANDBY FOR A BIG SURPRISE NEXT MEETING!**  
NAZIR has successfully plugged a Spectrum peripheral onto 2068 (with emulator) with no adaptor. To find out which one, come to the meeting!
2. Jeff S. is working with Zebra systems (who, we've been told, may also demo some equipment next meeting), on writing TS 2068 software which will create graphics, using a Koala pad.
3. Heinz has used his MD-68 Modem's RS232 port to download data from his EP-44. We'll need more sophisticated software to make efficient use of this printer, but the possibilities are awesome. E.g., download a program (4K) to the EP-44 and then, have almost instant upload to your 2068 as the EP-44's battery backed up memory "keeps" the program "fresh". Or, write programs "on the road" on your EP-44, then upload and edit when you get home.
4. Richard Shephard's new graphic-text adventure "The Inferno", is apparently not compatible with either EMU-1 or ROM replacement. RSS says they use all but 500 bytes of the 48K in the Spectrum and that, as the TS 2068 has less available RAM, the program may not fit. Nazir and I have played with it and can't get it to load and run. A nybody else want to try?
5. Need a Disassembler? While the Sinclair (Crystal) and Hot Z versions are excellent, you might want to try Dick Scoville's. It's only \$5.00 (plus your blank tape) and does a very good job of disassembling the ROM and/or your code. Dick can be reached at 2313 W. Club Blvd., Durham, N.C. 27705.
6. Also from Triangle Sinclair Users Group, Doug Dewey has sent us his list of EM/ROM compatible Spectrum programs. We will have copies at the next meetings, or send a SASE and we'll send you one (it's several pages).
7. **MICRO REVIEWS**
  - a) Spectrum Software
    - The Hobbit - Text/graphics - very good
    - Jet Set Willy - Manic Miner - Arcade - very good
    - Everest Ascent - text - strategy - fair
    - 31 Ant Attack - Arcade - good
  - b) Marum's 2068 Intermediate/Advanced guide - Mixed review - As an intermediate text it's good. An "advanced" text it is not.
8. **ALMOST NEWS** - Tom Bent (Synware News) tells us that Ray Kingsley (Hot Z) has just about completely debugged the 2068 EXROM. Ray is also working on a Hot Z cartridge which will be in AROS, but transparent to the user. Expect the board to run about \$70.00. There are more bugs in the EXROM than those shown in the manual. Also, some of the "fixes" don't work exactly as given.  
  
Tom has worked up a revised ZX81 ROM, eliminating the bugs (e.g., IPRNT PW, LONG RMY delete, etc) which have plagued many of us. Write to him & Synware News for more info.

## LISTING Policy:

Annual Dues.....\$12.00 Issue Price \$1.50 (includes P&P)  
One "Sample" copy sent upon receipt of large SASE.  
Copies provided on exchange basis with other bona fide user groups.  
L.I.S.T.ing is published monthly by LIST (Long Island Sinclair Timex) Group  
a not-for-profit users group  
Your reviews, programs, comments, hardware projects, etc., are eagerly solicited for publication in LISTing.

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Please note our new address - P.O. BOX 438, Centerport, N.Y. 11721-0438  
Mail sent to the old address must be forwarded there and will take longer to reach us.

### NOTE: PARTIAL YEAR MEMBERSHIPS AVAILABLE

Normal membership year is Feb. through Jan. at cost of \$12.00. By keeping as many members as possible on that basis, we keep our costs and chances of error, down.

If you wish to begin subscribing later in the year, please sign up for the end of this year and all of next. E.g., to subscribe in Nov. 84, we ask that you remit \$16.00, which will cover you through Jan'86, rather than send 4.00 now and 12.00 in Jan. (the rates may go up then also)

We will accept partial years or different subscription runs, on a limited basis (particularly from members outside the U.S.). But, please be aware that addition to possible rate increases, your "account" must be handled "by hand" and errors may occur. More on international members next issue.

### PRINTING:

We have received a number of complaints about size and legibility of the newsletter. Every effort is being made to correct these problems. We hope the size of print in this issue is more acceptable. Large issues cost almost 2X as much to mail, though, and may cause us to raise rates, next year. Let us know how you feel about this.

A proposal to have our next meeting on Thursday, Nov. 29 @ 8PM at the Commack Library has been made. Please be prepared to comment on this at the Oct. meeting.

10/8

## HINTS & TIPS

1. Herbert W. typed in the "piano" program from last month, but wanted to get up and running faster. He revised piano to use SCREEN \$ to LOAD the keyboard and cut LOAD time in half. Try it.
2. Marty J., has been entering some Microsoft BASIC programs into his 2068. He offers the following sample correlation for STRING handling.

MICROSOFT	RESULTS	SINCLAIR BASIC
MID\$(A\$,3,2)	LL	A\$(3 to 4)
LEFT\$(A\$,2)	HE	A\$(to 2)
RIGHT\$(A\$,2)	LO	A\$(LEN(A\$)-1 To)

### MICROSOFT BASIC

```

10 A$="HELLO"
20 LPRINT MID$(A$,3,2)
30 LPRINT LEFT$(A$,2)
40 LPRINT RIGHT$(A$,2)
LL
HE
LO

```

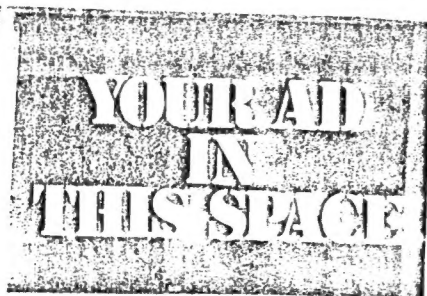
### SINCLAIR BASIC

```

10 LET a$="hello"
20 PRINT a$(1 TO 2)
30 PRINT a$(3 TO 4)
40 PRINT a$(LEN a$-1 TO )

```

NOTE: Lines 20 & 30 are reversed.



L.I.S.T. Group

## 3. FROM TRIANGLE NEWSLETTER:

### More on Darkening the Printer Dick Scoville

My original plan was to make the following program an example in this month's machine code tutorial and explain it line by line, but it requires some familiarity with so many things that it's best just to give it as is. The idea is very simple: write a new character set. Don't panic, the program itself will do all the work for you in the twinkling of an eye. Here is the program, in Z80 mnemonics and in decimal and in hex--all 29 bytes of it:

```

57786 LD DE,00DD      56576
57789 PUSH DE
57790 LD BC,0003      768
57793 LD HL,(365C)    CHARS
57796 INC H
57797 LD A,(HL)
57798 AND A
57799 RRA
57800 OR (HL)
57801 LD (DE),A
57802 INC HL
57803 INC DE
57804 DEC C
57805 JR NZ,F6        57797
57807 DJNZ F4        57797
57809 POP HL
57810 DEC H
57811 LD (365C),HL    CHARS
57814 RET
57815 NOP
57816 NOP
57817 NOP

```

```

17  0  221 213 1  0  3  42
54  92 36 126 167 31 182 18
35  19 13 32 246 16 244 225
37  34 54 92 201

```

```

11  00 DD D5 01 00 03 2A
36 5C 24 7E A7 1F B6 12
23 13 00 20 F6 10 F4 E1
25 22 36 5C C9

```

Do the following:

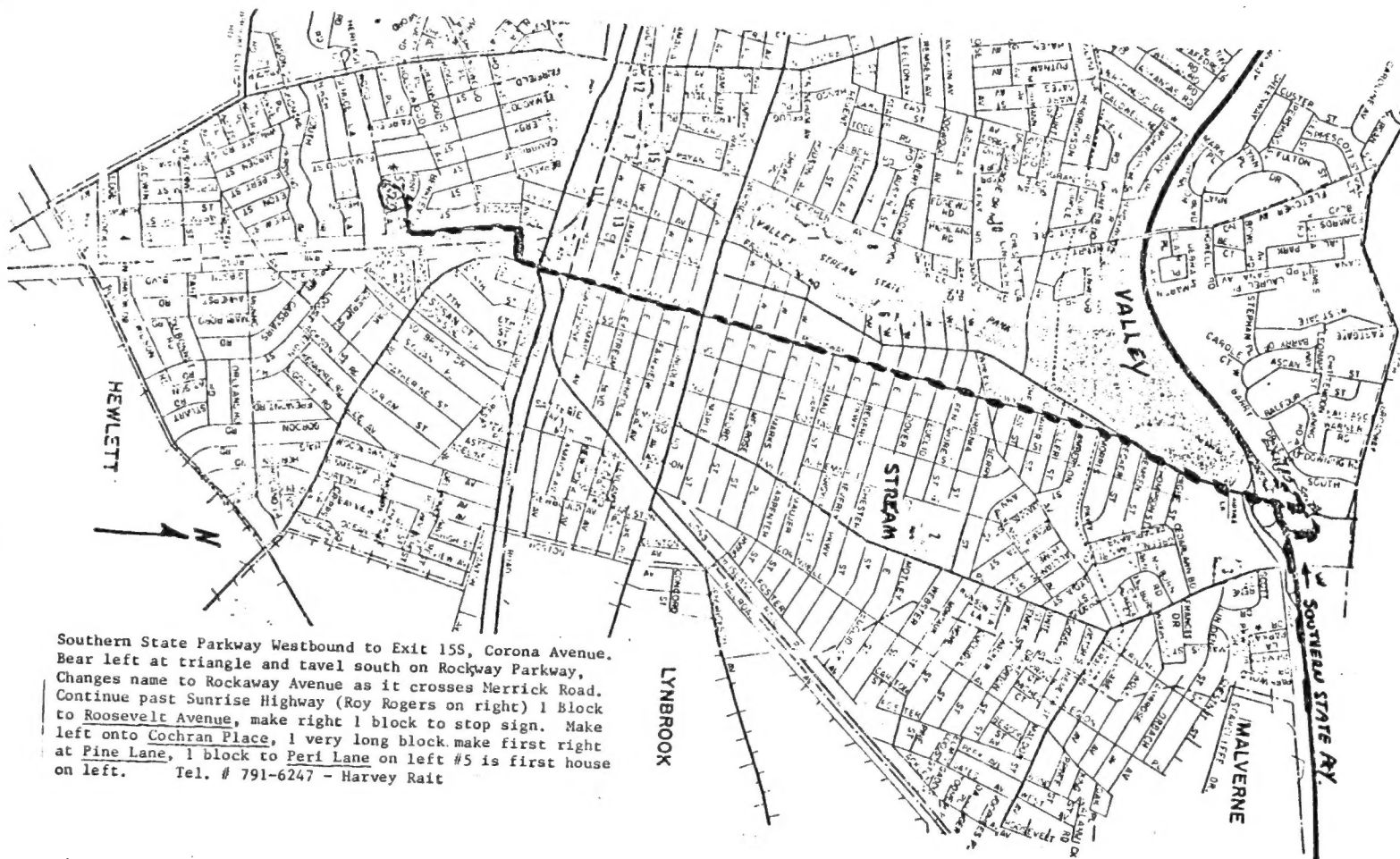
- 1) CLEAR 56575
- 2) LET sdt=57786
- 3) Enter the 29 bytes of code starting at address 57786
- 4) Peek them to be sure they are OK.

Now RANDOMIZE USA sdt will give you a new alphabet, which will be used by LPRINT, LLIST and COPY from now on. If you want to recover the old original alphabet, simply POKE 23607,60.



Paid membership (through Jan '85) is now 31.

Directions to Harvey's Place meeting  
to be held Sunday 28 October @ 2PM



Southern State Parkway Westbound to Exit 15S, Corona Avenue.  
Bear left at triangle and travel south on Rockway Parkway.  
Changes name to Rockaway Avenue as it crosses Merrick Road.  
Continue past Sunrise Highway (Roy Rogers on right) 1 Block  
to Roosevelt Avenue, make right 1 block to stop sign. Make  
left onto Cochran Place, 1 very long block make first right  
at Pine Lane, 1 block to Peri Lane on left #5 is first house  
on left. Tel. # 791-6247 - Harvey Rait

## MEMBERS ONLY PAGE

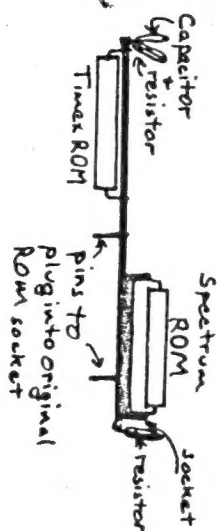
Zebra BBS (718) 296-2229

NEW YORK (212)  
Paladin's Palace/open/pswd/-  
Mediew (212) 699-0861  
ABBS (212) 896-0519  
Applesauce (212) 268-2062  
BAMS (212) 362-1040  
CONNECT 80 NYC (212) 991-1664  
Earth News Central (Apple II +)  
(212) 934-0774  
TFC ABBS NYC (212) 799-9577  
The Database BBS (212) 772-7167  
TICKETSCREEN (212) 986-1600  
Rainbow Connection (NY)  
1 (212) 441-3755  
2 (212) 441-3766  
3 (212) 441-5719  
4 (212) 441-5907  
PMS McGraw Hill Books NY  
212-512-2000  
T C BBS B.A.M.S. NY  
212-362-1040\*24  
PCRB/Gen/Open/Prm (212)  
490-1146  
BBBS/Sexual/Pswd (212) 541-5975  
BBBS/Gen/Pswd/Prm (212)  
775-1649  
AMIS/Gen/Pswd/Prm (212)  
241-8965  
AMIS/Gen/Open/Prm (212)  
464-3434  
PMS/6-8/Shop/Open (212) 512-2488  
BMBS: Avenger's Mansion (212)  
534-2858  
Gramercy Modem (212) 684-5594  
NYKUG (212) 624-9148  
Suspended (212) 596-2660

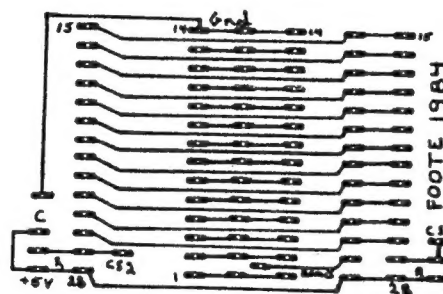
516  
Lion RBBS (516) 567-8267  
CONNECT 80/SOUTH (516)  
536-3510  
CONNECTION-80 (516) 588-5836  
CONNECT-80/Suffx (516) 924-8115  
Electric Mailman (516) 234-0925  
LICA CBBS (516) 561-6590  
MIDAS (516) 367-8619  
PIRATES COVE (516) 944-6712  
CONNECTION-80 Centereach.  
(516) 588-5836  
ABBS Pirates Cove (516) 698-4008  
Adventure BBS (516) 621-9296  
TBBS/Stock/Open (516) 794-1707  
RBBS/Gen/Pswd/Prm (516)  
The Dragon's Lair (516) 374-5071

### LOCAL BBS'S

(Thanks to Computer  
Living - N.Y.)



Schematic of Spectrum Emulator



Printed circuit layout for Spectrum Emulator.

FROM:  
Sinclair User Magazine  
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